

(6) A side scuttle of the non-opening type.

(b) *Heel angle.* The maximum angle of heel must not exceed 30 degrees.

(c) *Range of stability.* Through an angle of 20 degrees beyond its position of equilibrium after flooding, a tankship must meet the following conditions:

(1) The righting arm curve must be positive.

(2) The maximum righting arm must be at least 3.94 inches (10 cm).

(3) Each submerged opening must be weathertight.

(d) *Progressive flooding.* If pipes, ducts, or tunnels are within the assumed extent of damage, arrangements must be made to prevent progressive flooding to a space that is not assumed to be flooded in the damaged stability calculations.

(e) *Buoyancy of superstructure.* The buoyancy of any superstructure directly above the side damage is to be disregarded. The unflooded parts of superstructures beyond the extent of damage may be taken into consideration if they are separated from the damaged space by watertight bulkheads and no progressive flooding of these intact spaces takes place.

(f) *Metacentric height.* After flooding, the tank ship's metacentric height must be at least 2 inches (50 mm) when the vessel is in the upright position.

(g) *Equalization arrangements.* Equalization arrangements requiring mechanical aids such as valves or cross-flooding lines may not be considered for reducing the angle of heel. Spaces joined by ducts of large cross-sectional area are treated as common spaces.

(h) *Intermediate stages of flooding.* If an intermediate stage of flooding is more critical than the final stage, the tank vessel must be shown by design calculations to meet the requirements in this section in the intermediate stage.

#### § 172.205 Local damage.

(a) Each tankship must be shown by design calculations to meet the survival conditions in paragraph (b) of this section in each condition of loading and operation assuming that local damage extending 30 inches (76 cm)

normal to the hull shell is applied at any location in the cargo length:

(b) The vessel is presumed to survive assumed local damage if it does not heel beyond the smaller of the following angles in the final stage of flooding:

(1) 30 degrees.

(2) The angle at which restoration of propulsion and steering, and use of the ballast system is precluded.

### Subpart H—Special Rules Pertaining to Great Lakes Dry Bulk Cargo Vessels

SOURCE: CGD 80-159, 51 FR 33059, Sept. 18, 1986, unless otherwise noted.

#### § 172.215 Specific applicability.

This subpart applies to each new Great Lakes vessel of 1600 gross tons or more carrying dry cargo in bulk.

#### § 172.220 Definitions.

(a) As used in this subpart *Length (L)*, *Breadth (B)*, and *Molded Depth (D)* are as defined in § 45.3 of this chapter.

(b) As used in this part *new Great Lakes Vessel* means a vessel operating solely within the limits of the Great Lakes as defined in this subchapter that:

(1) Was contracted for on or after November 17, 1986, or delivered on or after November 17, 1988.

(2) Has undergone a major conversion under a contract made on or after November 17, 1986, or completed a major conversion on or after November 17, 1987.

CGD 80-159, 51 FR 33059, Sept. 18, 1986]

#### § 172.225 Calculations.

(a) Each vessel must be shown by design calculations to meet the survival conditions in § 172.245 in each condition of loading and operation, assuming the damage specified in § 172.230.

(b) When doing the calculations required by paragraph (a) of this section, the virtual increase in the vertical center of gravity due to a liquid in a space must be determined by calculating either—

(1) The free surface effect of the liquid with the vessel assumed heeled five degrees from the vertical; or